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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,057	11/17/2003	Vladimir I. Merkulov	UBAT1310-1	7024
38396	7590	07/28/2005	EXAMINER	
JOHN BRUCKNER, P.C. 5708 BACK BAY LANE AUSTIN, TX 78739			FULK, STEVEN J	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/715,057

Applicant(s)

MERKULOV ET AL.

Examiner

Steven J. Fulk

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 1-19, 32-37 and 42-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-31, 38-41 and 45-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/17/03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35

U.S.C. 121:

I. Claims 1-19, 32-37 and 42-44, drawn to a method of making a carbon based electron emitter, classified in class 438, subclass 478.

II. Claims 20-31, 38-41 and 45-47, drawn to a carbon based electron emitter, classified in class 257, subclass 10.

2. The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as epitaxial and physical vapor deposition.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

3. During a telephone conversation with John Bruckner on 6/30/05 a provisional election was made without traverse to prosecute the invention of a carbon based electron emitter, claims 20-31, 38-41 and 45-47.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-19, 32-37 and 42-44 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*,

422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 20-31 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 20-29 of U.S. Patent No. 6,649,431. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 20-29 of U.S. Patent No. 6,649,431 fall entirely within the scope of claims 20-31 of the application, or in other words, claims 20-31 of the application are anticipated by claims 20-29 of U.S. Patent No. 6,649,431. Specifically, the "carbon containing expanded base" of claims 20-31 is anticipated by claims 20-29 of U.S. Patent No. 6,649,431 reciting a "carbon containing expanded base including a precipitated graphitic carbon film".

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 45-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "mechanically strong" in claim 45 is a relative term which renders the claim indefinite. The term "mechanically strong" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 20-23, 25, 26, 28-31, and 45-47 are rejected under 35

U.S.C. 102(b) as being anticipated by Blanchet-Fincher et al. '677.

a. Regarding claims 20-23, 25, 26 and 28-31, Blanchet-Fincher et al. discloses an electron emitter comprising a plurality of solid cone carbon bases coupled to a substrate (col. 4, lines 12-16), the bases including a precipitated graphitic carbon film (col. 5, lines 2-8, 64-67; col. 6, lines 1-2), and with a solid rod carbon extension coupled to each base (col. 6, lines 2-8).

b. Insofar as definite, claims 45-47 are anticipated by Blanchet-Fincher et al. Claims 45-47 are drawn to a carbon nanostructure that has a mechanically strong connection between the base and the substrate, and more specifically a carbon nano-cone structure with such a property. The mechanically strong connection between the base and substrate is derived from the cone shape of the structure, and such a connection between base and structure would exist in the cone structure of Blanchet-Fincher et al. as described above.

10. Claims 38-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Jin '132.

Jin discloses an electron emitter comprising a sharp tip carbon nanostructure coupled to a substrate (col. 2, lines 45-49; col. 4, lines 56-64; col. 12, line 63 – col. 13, line 20). The carbon nanostructure defines a tip

diameter that is a function of a catalyst droplet size (col. 5, lines 57-60), and the nanostructure has a height and base diameter grown to a micron size (col. 7, lines 56-59).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blanchet-Fincher et al. '677 as described above, and further in view of Bardai et al. '070. Blanchet-Fincher et al. teaches all of the matter listed above, but does not teach a hollow funnel carbon containing expanded base. Bardai et al. teaches the use of a hollow funnel as an electron emitter base (col. 2, lines 59-62; col. 5, lines 15-23). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the hollow funnel of Bardai et al. in the carbon emitter of Blanchet-Fincher et al. because the thin funnel walls increase the electric field at the emitter and improve the electron emission properties.

13. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blanchet-Fincher et al. '677 as described above, and further in view of

Uemura et al. '677. Blanchet-Fincher et al. teaches all of the matter listed above, but does not teach the use of a hollow tube carbon containing extension. Uemura et al. teaches the use of a hollow carbon nanotubes as an electron emitter (col. 4, lines 41-43; col. 5, lines 14-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the hollow carbon tube of Uemura et al. instead of the solid carbon rod in the emitter of Blanchet-Fincher et al. because the thin tube walls increase the electric field at the emitter and improve the electron emission properties.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Chuang et al. '931 and Xu et al. '422 disclose a carbon nanotube field emitter device.
- b. Keesmann et al. '223 and Lee et al. '281 disclose a field emitter device with a base and cylindrical emitter.
- c. Itoh et al. '885, Iwasa et al. '790, Yoshiki '605, and Dimitrijevic et al. '078 disclose a conical field emitter device.


15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven J. Fulk whose telephone

number is (571) 272-8323. The examiner can normally be reached on Monday through Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sjf
7/14/05



B. WILLIAM BAUMEISTER
SUPERVISORY PATENT EXAMINER